

Information for Contributors ..... v

Cross Sections for Electronic Collisions with Water Molecules ..... 1

*Yukikazu Itikawa and Nigel Mason*

Cross section data have been compiled from the literature for electronic collisions with water molecules. The collected data is assessed and recommendations for the values of the cross sections are provided. Isotope effects (hydrogen versus deuterium) are discussed as far as information is available.

Spectroscopic Studies of Diatomic Gallium Halides ..... 23

*V. B. Singh*

A critical review of the available spectroscopic information on the four diatomic gallium halides has been performed. The literature survey extends to early 2003 and the experimental and theoretical data on the molecular constants for the ground state as well as for the excited states of these molecules is presented. A brief discussion on the spectroscopic properties of different electronic states, ionization potentials, ground state dissociation energies, and percentage ionic character are given. The RKR potentials for the different electronic states and centrifugal distortion constants for the observed vibrational levels of these electronic states are also presented.

Erratum: "Estimation of the Heat Capacities of Organic Liquids as a Function of Temperature Using Group Additivity. An Amendment." [J. Phys. Chem. Ref. Data 33, 1071 (2004)] ..... 39

*Milan Zábranský and Vlastimil Růžička, Jr.*

Intrinsic Wavelength Standard Absorption Bands in Holmium Oxide Solution  
for UV/visible Molecular Absorption Spectrophotometry ..... 41

*John C. Travis, Joaquin Campos Acosta, György Andor, Jean Bastie, Peter Blattner, Christopher J. Chunnillall, Steven C. Crosson, David L. Duewer, Edward A. Early, Franz Hengstberger, Chang-Soon Kim, Leif Liedquist, Farshid Manoocheri, Flora Mercader, Akihiro Mito, L. A. G. Monard, Saulius Nevas, Morgan Nilsson, Mario Noël, Antonio Corróns Rodríguez, Arquímedes Ruiz, Alfred Schirmacher, Melody V. Smith, Guillermo Valencia, Natasha van Tonder, Joanne Zwinkels*

The transmittance minima of eighteen adsorption bands of a solution of 40 g/L holmium oxide in 10% (volume fraction) perchloric acid are certified as intrinsic traceable wavelength standards, by means of a multicenter measurement on material from a single source coupled with comparisons of a variety of preparations of the material evaluated on a single instrument. The intrinsic (data) standard confers traceability to the SI unit of length in place of costly transfer artifacts and repetitive calibration procedures.

Isotopic Compositions of the Elements, 2001 ..... 57

*J. K. Böhlke, J. R. de Laeter, P. De Bièvre, H. Hidaka, H. S. Peiser, K. J. R. Rosman, P. D. P. Taylor*

The Commission on Atomic Weights and Isotopic Abundances (CAWIA) of the International Union of Pure and Applied Chemistry (IUPAC) completed its last review of the isotopic compositions of the elements as determined by isotope-ratio mass spectrometry in 2001. The representative isotope abundances and uncertainties generally are consistent with the standard atomic weights of the element  $A_r(E)$  and its uncertainty  $U[A_r(E)]$  recommended by CAWIA in 2001.

A New Functional Form and New Fitting Techniques for Equations of State with Application to Pentafluoroethane (HFC-125) ..... 69

*Eric W. Lemmon and Richard T Jacobsen*

A widely used form of an equation of state explicit in Helmholtz energy has been modified with new terms to eliminate certain undesirable characteristics in the two phase region. New fitting techniques have been implemented to ensure proper extrapolation of the equation at low temperatures, in the vapor phase at low densities, and at very high temperatures and pressures. A formulation is presented for the thermodynamic properties of refrigerant 125 (pentafluoroethane) using the new terms and fitting techniques.

<b>Rate Constants for Reactions of Phenoxyl Radicals in Solution.....</b>	<b>109</b>
<i>Pedatsur Neta and Jan Grodkowski</i>	

Absolute rate constants for reactions of phenoxyl radicals in solution have been compiled and evaluated from the literature. The radicals were generated by radiolysis, photolysis, thermolysis, or chemical reactions, and their rate constants were determined generally by kinetic spectrophotometry or electron spin resonance.

<b>IUPAC-NIST Solubility Data Series. 80. Gaseous Fluorides of Boron, Nitrogen, Sulfur, Carbon, and Silicon and Solid Xenon Fluorides in all Solvents .....</b>	<b>201</b>
<i>H. Lawrence Clever</i>	

The literature has been searched through 2002 June for solubility data on the gases  $\text{BF}_3$ ,  $\text{NF}_3$ ,  $\text{N}_2\text{F}_4$ ,  $\text{SF}_6$ ,  $\text{CF}_4$ ,  $\text{CHF}_3$ ,  $\text{CH}_2\text{F}_2$ ,  $\text{CH}_3\text{F}$ ,  $\text{C}_2\text{F}_6$ ,  $\text{CHF}_5$ , 1,1,1,2- $\text{C}_2\text{H}_2\text{F}_4$ , 1,1,1-C<sub>2</sub>H<sub>3</sub>F<sub>3</sub>, 1,1-C<sub>2</sub>H<sub>4</sub>F<sub>2</sub>,  $\text{CH}_5\text{F}$ ,  $\text{C}_3\text{F}_8$ , *c*- $\text{C}_4\text{F}_8$ ,  $\text{C}_2\text{F}_4$ , 1,1-C<sub>2</sub>H<sub>2</sub>F<sub>2</sub>,  $\text{C}_2\text{H}_3\text{F}$ ,  $\text{C}_3\text{F}_6$ ,  $\text{C}_3\text{F}_6\text{O}$ , and  $\text{SiF}_4$  and the solids  $\text{XeF}_6$ ,  $\text{XeF}_4$ , and  $\text{XeF}_2$  in all solvents. The evaluations were mostly carried out for water as a solvent. For other systems there is often only one set of measurements or two sets of measurements, which do not agree well.

<b>JPCRD Supplements &amp; Monographs .....</b>	<b>.439</b>
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